

WA0XL-A

POWER METER SET

1. GENERAL. This procurement requires a test set capable of measuring CW and pulsed RF power levels.

2. CLASSIFICATION. Type II, Class 5, Style EP or ES, and Color R in accordance with MIL-T-28800 for shipboard applications.

3. MEASUREMENT REQUIREMENTS. The test set shall be capable of measuring the peak power levels of pulsed RF signals, the RMS power levels of CW signals, and the difference in levels between two channels, with the accuracies and additional capabilities specified below.

3.1 Measurement ranges.

3.1.1 Peak power. -20 to +20 dBm, full scale, from 50 MHz to 18 GHz.

3.1.2 CW power. -60 to +20 dBm from 10 MHz to 18 GHz.

3.2 Power meter. A dual-channel digital indicating meter with at least 4-1/2 digits of resolution, an analog peaking meter or bar-graph equivalent, and the capability of averaging up to 128 measurements is required. The meter shall indicate power in dBm, dB relative, or Watts (prefixed with m, μ , n, or p, as appropriate). The meter display shall indicate when peak power is being measured. The meter shall have high and low measurement limit settings and an audible warning for when the limits are exceeded. The meter shall be capable of indicating the difference in levels between the two channels as A-B or B-A.

3.2.1 Power meter stability. The power meter shall drift no more than $\pm 1.5\%$ of full scale from zero set on the most sensitive range or ± 100 pW, irrespective of the sensor configuration, within 5 minutes of zero set in a non-averaging mode of operation.

3.2.2 Zero set. When automatic zeroing is not a function of the instrument, the power meter shall be provided with a control that permits zero adjustment.

3.2.3 Power reference. The power meter shall be provided with an internal power reference for adjusting the instrument to match the sensitivity of multiple power sensors. The power reference shall be 1 mW $\pm 1.2\%$ for one year.

3.2.4 Calibration factor control. Provision shall be made to allow manual entry of power sensor calibration factors. Calibration factors may be contained in EEPROM in the individual sensors and automatically downloaded to the meter or stored in user-alterable non-volatile RAM in the meter. When calibration data is stored in the meter, capacity shall be provided for data on at least 8 sensors.

3.2.5 Outputs. A recorder-compatible output shall be provided which is linearly proportional to the indicated power on each range. Additionally, the instrument shall have a video output proportional to the detected RF envelope. The video output rise and fall times shall be 125 nS or less into a nominal impedance of 50 ohms.

3.3 Sensor characteristics and measurement requirements.

3.3.1 Peak detecting sensor. Two sensors are required with the characteristics detailed in 3.3.1.1 through 3.3.1.8. The sensors shall be capable of measuring CW power within the power and frequency range specified in 3.1.1. When configured to measure one type signal, the sensor shall not respond to the

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other (i.e. it shall not respond to pulsed signals when configured to measure CW signal power).

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3.3.1.1 Modulation. The sensor shall respond to pulse modulated signals with modulation rates of 25 Hz to 500 kHz, pulse widths of 50 nS and greater, and a duty cycle range of 0.1% to 100%.

3.3.1.2 Trigger. The sensor shall be capable of internal and external triggering. External triggering may be accomplished through an input on the meter. The sensor shall be capable of having the measurement point delayed from the trigger point by an amount programmable from the meter. The programmable delay shall range from 0.1 μ S to 20 mS. Delay accuracy: $\pm(4\%$ of reading) above 1 μ S.

3.3.1.3 Overload protection. 200 mW continuous or peak.

3.3.1.4 Impedance. 50 ohms nominal.

3.3.1.5 Maximum standing wave ratio (SWR). 1.15 from 50 MHz to 2.0 GHz, 1.25 from 2.0 to 12.4 GHz, and 1.4 from 12.4 to 18.0 GHz.

3.3.1.6 Total measurement uncertainty (RSS). $\pm 7.5\%$ from 50 MHz to 18 GHz not including source mismatch but including instrumentation accuracy.

3.3.1.7 Overrange indication. The meter shall indicate an overrange condition when the power level exceeds the operating range of the sensor.

3.3.1.8 RF connector. Type N(m).

3.3.2 CW sensor. One sensor is required with the characteristics detailed in 3.3.2.1 through 3.3.2.6. The sensor for measuring CW power may be either average responding or true rms. The sensor shall not respond to pulsed RF signals.

3.3.2.1 Impedance. 50 ohms nominal.

3.3.2.2 Maximum SWR. 2.0:1.

3.3.2.3 Total measurement uncertainty (RSS). $\pm 2.0\%$ from 10 MHz to 8.0 GHz, and $\pm 4.0\%$ from 8.0 to 18.0 GHz. These values do not include source mismatch but do include instrumentation accuracy.

3.3.2.4 Overload protection. 200 mW continuous or peak.

3.3.2.5 Overrange indication. The meter shall indicate an overrange condition when the power level exceeds the operating range of the sensor.

3.3.2.6 RF connector. Type N(m).

3.4 Interconnecting cable length. Two each 1.5 meter (5 ft) and two each 3.0 meter (10 ft) sensor cables.

4. GENERAL REQUIREMENTS.

4.1 Power source. MIL-T-28800 nominal power source requirements are invoked. Maximum power consumption: 25W.

4.2 Weight. 20 kg (44 lb) maximum.

4.3 Digital interface. A digital interface is required in accordance with MIL-T-28800.

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4.4 Lithium batteries. Per MIL-T-28800, lithium batteries are prohibited without prior authorization. A request for approval for the use of lithium batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.

4.5 Transit case. The transit case shall provide protection for all components of the power measuring test set.